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ABSTRACT

Two-column objectives are listed for an integrated science curriculum (grades K-12), often subheaded according to science area (biology, earth science, physical science) and grade level. The objectives for grades K-8 include areas of study in earth science that can be used as examples of the scientific concept of change. Grade 10 includes objectives in the biological sciences such as the study of photosynthesis, physiological systems, ecological succession, and humans' special adaptations and influence on the earth. (CS)

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SCIENCE

K - 12

CONTINUOUS CHANGE IN THE UNIVERSE

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SCIENCE

K - 12

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PROJECT SEARCH

ARTICULATED CURRICULUM

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MRS. ROSE DANELLA and NORMAN I. SIEGEL, both former Board Members deserve special mention for all their efforts on behalf of Project SEARCH.

UTICA CITY SCHOOL DISTRICT
13 Elizabeth Street
Utica, New York 13501

SCIENCE

CONTINUOUS CHANGE IN THE UNIVERSE

The student will know:	The student will:
- that the earth is very large.	- identify the planet Earth in a picture of the u discuss relative sizes.
- that the earth is made up of land, water, and air.	- point to water and land areas on a globe and di oceans, etc.
- that all things on earth can be utilized.	- name ways land and water are used by man, plant animals.
- that rocks have various colors, shapes and sizes.	- collect and identify rocks by size, shapes or c
- that gravel, pebbles, and sand are small pieces of rocks.	- explain how gravel and pebbles came into being some to make same.
- that some rocks are rough, some are smooth.	- identify surface of rocks while blindfolded, an how they feel and suggest how they got that way some are smooth and some are rough.
- that there are many planets in the univers.	- point to the planets in a picture of the univer
- that there is a sun and there is a moon and stars.	- identify the sun, moon and stars by name from a
- the turning of the earth and the sun gives us day and night.	- explain briefly how the earth turns to give day
- there are various sizes of heavenly bodies.	- identify by size the moon, sun, stars and earth picture of them.
- that energy comes from the sun.	- explain that the sun makes heat and heat is ene
- that all living things depend upon the sun's energy.	- report on plants that were given light and plan not.

CONTINUOUS CHANGE IN THE UNIVERSE

Grade K

The student will:

rge.	- identify the planet Earth in a picture of the universe and discuss relative sizes.
of land, water,	- point to water and land areas on a globe and discuss lakes, oceans, etc.
can be utilized.	- name ways land and water are used by man, plants, and animals.
colors, shapes and	- collect and identify rocks by size, shapes or color.
sand are small	- explain how gravel and pebbles came into being and hammer some to make same.
, some are smooth.	- identify surface of rocks while blindfolded, and describe how they feel and suggest how they got that way or why some are smooth and some are rough.
ts in the universe.	- point to the planets in a picture of the universe.
here is a moon and	- identify the sun, moon and stars by name from a picture.
and the sun gives us	- explain briefly how the earth turns to give day and night.
f heavenly bodies.	- identify by size the moon, sun, stars and earth from a picture of them.
sun.	- explain that the sun makes heat and heat is energy.
end upon the sun's	- report on plants that were given light and plants that were not.

- the sun makes shadows.	- hold a flashlight in 3 positions to illustrate in a.m., noon, and p.m.
- that stars reflect light, but can be seen only at night.	- explain why stars cannot be seen in daylight, a how stars look at night.
- that land and water make up the earth's surface.	- be able to distinguish between land and water fo globe.
- that rocks have many differences.	- be aware of differences such as size, shape, co texture of rocks.
- that stone and soil have many uses.	- draw pictures showing the uses of soil and ston
- that the earth is round.	- make a papier-mache' model of the earth.
- the sun is larger than the earth.	- observe a mobile of the solar system, and compar relative sizes.
- that there are 9 planets.	- be aware that there are 9 planets and we live on
- the reason for day and night.	- illustrate with a globe and a flashlight the day cycles.
- that different kinds of soil are formed by different kinds of rock.	- describe what happens when two pieces of sandsto rubbed together.
- that soil contains bits of broken rock and decaying pland and animal matter.	- compare color, texture, and content of samples o found in his neighborhood.
- that soils differ in their ability to hold water.	- explain results of an experiment in which rich t been placed in a jar, filled with 2/3 water, sha and left standing. Floating material would then examined under the microscope.
	- pour water into various soil samples and record

- hold a flashlight in 3 positions to illustrate shadows in a.m., noon, and p.m.

t, but can be seen only at- - explain why stars cannot be seen in daylight, and report on how stars look at night.

Grade 1

e up the earth's - be able to distinguish between land and water forms on a globe.

fferences. - be aware of differences such as size, shape, color and texture of rocks.

e many uses. - draw pictures showing the uses of soil and stone.

- make a papier-mache' model of the earth.

the earth. - observe a mobile of the solar system, and compare the relative sizes.

. - be aware that there are 9 planets and we live on earth.

ight. - illustrate with a globe and a flashlight the day-night cycles.

soil are formed by - describe what happens when two pieces of sandstone are rubbed together.

of broken rock and l matter. - compare color, texture, and content of samples of soil found in his neighborhood.

ir ability to - explain results of an experiment in which rich topsoil has been placed in a jar, filled with 2/3 water, shaken and left standing. Floating material would then be examined under the microscope.

- pour water into various soil samples and record results.

- the earth is composed of layers.	- after simulating layers of soil with colored mode clay, describe the various layers.
- that rocks are being constantly worn down or being broken by wind, water, temperature changes, plants and chemicals.	- after experiments such as shaking pieces of broke in a plastic or metal container filled with wate observing the differences after shaking vigorousl 25,50,100 times the student will explain how roc affected by wind, water, temperature, etc.
- that most plants need soil which contains an organic matter.	- compare differences after performing experiments as planting and caring for two bean seeds, one i of cotton and one in soil.
-that topsoil is a valuable resource and should be conserved.	- make a scrapbook collection of pictures illustra good conservation practices and poor conservatio practices. Discuss this comparison.
- the earth revolves around the sun once a year. Thus causing seasons.	- demonstrate that the Earth revolves around the s a year by moving a small ball (Earth) around a l (Sun).
- that the change of seasons affects living things.	- answer the question: if you are seven years old old would you be by the time the Earth has gone the Sun?
	- explain how change of seasons affect plant and a
- the earth rotates as it revolves about the sun. Rotation causes day and night.	- demonstrate that the Earth rotates as it revolve sun by moving a globe around a lamp or a flashlig
- the sun rises in east-sets in west.	- describe results of keeping a daily record of su and sunset.
- the Moon is Earth's nearest neighbor.	- explain why the moon, which is much smaller than Sun, looks so large to us?
- the sun is a star. Stars always shine.	- explain why we call the sun "our own star.

layers.	- after simulating layers of soil with colored modeling clay, describe the various layers.
stantly worn wind, water, nts and chemicals.	- after experiments such as shaking pieces of broken bricks in a plastic or metal container filled with water, and observing the differences after shaking vigorously after 25,50,100 times the student will explain how rocks are affected by wind, water, temperature, etc.
oil which contains an	- compare differences after performing experiments, such as planting and caring for two bean seeds, one in a pad of cotton and one in soil.
e resource and should	- make a scrapbook collection of pictures illustrating good conservation practices and poor conservation practices. Discuss this comparison.
d the sun once a year.	- demonstrate that the Earth revolves around the sun once a year by moving a small ball (Earth) around a large ball (Sun).
ns affects living	- answer the question: if you are seven years old now, how old would you be by the time the Earth has gone around the Sun?
	- explain how change of seasons affect plant and animal life.
evolves about the y and night.	- demonstrate that the Earth rotates as it revolves about the sun by moving a globe around a lamp or a flashlight.
ts in west.	- describe results of keeping a daily record of sunrise and sunset.
est neighbor.	- explain why the moon, which is much smaller than the Sun, looks so large to us?
always shine.	- explain why we call the sun "our own star.

- the stars look small because they are so far away.	- discuss why we see more stars when we look at through a telescope.
- that our sun is the center of the solar system.	- draw the solar system. - make a mobile of the solar system.
- the surface of the earth is constantly changing	- discuss effects of earthquakes and volcanoes. - make a mural and discuss manner in which wind, temperature cause changes in the surface of the
- the interior of the earth differs from its surface.	- make charts illustrating basic concepts of crus core.
- the classification of rocks and what rocks can tell about earth.	- make and label a rock display.
- that fossils are imprints of early plant and animal life.	- make sand casts of plant and animal remains to how fossils are formed.
- that minerals are natural substances from which rocks are made.	- identify minerals in various rocks.
- the need to maintain a healthy environment through a balance of our resources.	- arrange a bulletin board display of pictures ill soil, animal, water, and plant conservation prac - discuss needs of fish for survival after visitin hatchery. - be able to explain and illustrate a food chain.
- that there are regular movements made by the planets.	- write the meanings for revolution and rotation a demonstrate movements through the use of a model
- that we are but one galaxy among many.	- name our galaxy and that which is contained with

ecause they are so	- discuss why we see more stars when we look at the sky through a telescope.
ter of the solar	- draw the solar system.
	- make a mobile of the solar system.
	Grade 3
h is constantly changing	- discuss effects of earthquakes and volcanoes.
	- make a mural and discuss manner in which wind, ice and temperature cause changes in the surface of the earth.
th differs from	- make charts illustrating basic concepts of crust, mantle, core.
cks and what rocks can	- make and label a rock display.
s of early plant and	- make sand casts of plant and animal remains to demonstrate how fossils are formed.
l substances from	- identify minerals in various rocks.
ealthy environment resources.	- arrange a bulletin board display of pictures illustrating soil, animal, water, and plant conservation practices.
	- discuss needs of fish for survival after visiting fish hatchery.
	- be able to explain and illustrate a food chain.
vements made	- write the meanings for revolution and rotation and demonstrate movements through the use of a model.
y among many.	- name our galaxy and that which is contained within it.

- that advancements are being made in space exploration.	- name some of the space projects. - explain the differences between "Science Fact" a "Science Fiction" from explorations studied.
- the earth, revolving around the Sun, causes our change of seasons.	- draw a diagram of the Earth and its orbit around for the various seasons.
- the sun is a star among many more in the universe around which possible planets revolve.	- draw an illustration of our solar system.
- the planets and their position in relation to the Sun.	- construct a solar system model from clay showing relationship of each planet to the Sun and to ea
- the motion and path of our planets around our Sun is predictable.	- write a report and use illustrations to show the each planet around the Sun. - write a composition hypothesizing what life woul on another planet.
- the interior of the Earth is hot as evidenced by volcanoes, earthquakes, and geysers.	- make a model of a volcano. - write a report on the causes and earth building of volcanoes and earthquakes.
- that erosion changes the surface of the Earth.	- observe different types of erosion in his enviro will analyze the causes of each kind of change (constructive and destructive.)
- that oceans have been made salty by the dissolved minerals that streams have carried into them.	- explain what happens when ocean water is allowed evaporate.
- that soil conservation practives include crop rotation, terracing, and contour farming.	- compile examples of good soil conservation practi

being made in space	- name some of the space projects.
	- explain the differences between "Science Fact" and "Science Fiction" from explorations studied.
	Grade 4
round the Sun, causes	- draw a diagram of the Earth and its orbit around the sun for the various seasons.
g many more in the possible planets	- draw an illustration of our solar system.
position in relation	- construct a solar system model from clay showing the relationship of each planet to the Sun and to each other.
our planets around	- write a report and use illustrations to show the orbit of each planet around the Sun.
	- write a composition hypothesizing what life would be like on another planet.
rth is hot as earthquakes,	- make a model of a volcano.
	- write a report on the causes and earth building forces of volcanoes and earthquakes.
e surface of the Earth.	- observe different types of erosion in his environment and will analyze the causes of each kind of change (both constructive and destructive.)
ade salty by the streams have	- explain what happens when ocean water is allowed to evaporate.
practives include g, and contour	- compile examples of good soil conservation practices.

- report and illustrate soil conservation practic

- that in the center of our Solar System is the Sun, and orbiting around the Sun are many heavenly bodies.

- construct a miniature replica of our Sun and it and moons.

- identify the planets and their approximate dist the sun.

- that our solar system belongs to the Milky Way Galaxy, which in turn is part of our infinite universe.

- draw a picture of our solar system in the Milky showing its place in the universe.

- that our universe is infinite and is constantly changing.

- write a report demonstrating such concepts as d in light years, and include a diagram to illust

- that the diameter of our Milky Way Galaxy is ab 100,000 light years.

- calculate the number of seconds in a light year speed of light (186,000 miles per sec.) to det number of miles in a light year.

- explain why astronomers use measuring units suc years, rather than miles to describe astronomic

- that bodies in space (as well as their matter and energy) are in constant change.

- estimate the distance in light years of certain our galaxy and the distance of other galaxies fr Milky Way.

- chart the orbit of Halley's Comet.

- investigate the life stages of a star as it trav our universe.

- research certain groups of stars in our Milky Wa such as open clusters and globular clusters.

- report and illustrate soil conservation practices.

Grade 5

of our Solar System
iting around the Sun
odies.

- construct a miniature replica of our Sun and its planets and moons.

- identify the planets and their approximate distances from the sun.

em belongs to the
hich in turn is
e universe.

- draw a picture of our solar system in the Milky Way Galaxy, showing its place in the universe.

s infinite and is
.

- write a report demonstrating such concepts as distance in light years, and include a diagram to illustrate.

- that the diameter of our Milky Way Galaxy is about 100,000 light years.

- calculate the number of seconds in a light year by the speed of light (186,000 miles per sec.) to determine the number of miles in a light year.

- explain why astronomers use measuring units such as light years, rather than miles to describe astronomical distances.

(as well as their matter
onstant change.

- estimate the distance in light years of certain stars in our galaxy and the distance of other galaxies from our Milky Way.

- chart the orbit of Halley's Comet.

- investigate the life stages of a star as it travels through our universe.

- research certain groups of stars in our Milky Way Galaxy such as open clusters and globular clusters.

- the interior of the earth is compased of three layers.	- construct an accurate cross section model of our showing the relative size of the crust, mantle a
	- identify, in chart form, the various minerals fo of the earth's layers.
- that rocks can be divided into three main groups.	- write a composition identifying the three main g rocks and explain how each is formed.
	- collect and identify specimens of each of the th
- the importance of ecology for the preservation of life on earth.	- report and illustrate the food chain cycle of li including the harmful effects pollution would ha cycle.
	- list man's use and misuse of his natural resourc the effects of each.
- the harmful effects of air and water pollution.	- identify evidences of air pollution in his own c
	- collect information and write a report on the wo effect of water pollution on our environment and himself.
	- attempt to initiate a solution to our pollution
- that in nuclear reactions, the nuclei of atoms are divided (fission) or combined (fusion).	- draw two illustrations showing differences betwe and fusion.
- that nuclear reactions are the source of the sun's energy.	- construct mobile of any atomic element showing n fission and fusion.
	- draw and label parts of solar furnace.
- that each atom consists of particles arranged in its own characteristic structure.	- construct a model of an atom labeling its charac structure.

rth is compased of	- construct an accurate cross section model of our earth showing the relative size of the crust, mantle and core.
	- identify, in chart form, the various minerals found in each of the earth's layers.
ded into three	- write a composition identifying the three main groups of rocks and explain how each is formed.
	- collect and identify specimens of each of the three groups
ogy for the preserva-	- report and illustrate the food chain cycle of life on earth including the harmful effects pollution would have on this cycle.
	- list man's use and misuse of his natural resources and the effects of each.
air and water pollution.	- identify evidences of air pollution in his own community.
	- collect information and write a report on the world-wide effect of water pollution on our environment and on man himself.
	- attempt to initiate a solution to our pollution problem.

Grade 6

ns, the nuclei of ion) or combined	- draw two illustrations showing differences between fission and fusion.
are the source of	- construct mobile of any atomic element showing nuclear fission and fusion.
	- draw and label parts of solar furnace.
of particles raeteristic	- construct a model of an atom labeling its characteristic structure.

- the parts of the atom are tightly bound together; certain parts are electrically charged.	- describe in his own words, in writing what has o when atoms are electrically charged.
- that nuclear energy can be harnessed to machines to develop other forms of energy to do work.	- draw a diagram labeling the steps of energy chan nuclear power plant.
- the rules governing the reading of a topographic map.	- recite the rules involved in the reading of a to map.
	- construct contour lines from a map with plotted only.
	- construct a topographic profile from a topograph
	- make a three dimensional clay model from a small of a topographic map.
- the use of a topographic map.	- name and locate churches, schools and mines from ographic map.
	- name and locate the steep hills and mountains fr topographic map.
	- recite the direction of any river on a topograph
	- recite the elevation of any point on a topograph
	- construct a three dimensional topographic profil quandrangle of an area of Utica.
- the layers that make up the atmosphere.	- name the layers of the atmosphere and the major istics of each layer.
- the major gases found in the troposphere.	- list the names of the gases found in the troposp the percentage of each.

ightly bound electrically	- describe in his own words, in writing what has occured when atoms are electrically charged.
harnessed to orms of energy	- draw a diagram labeling the steps of energy change in a nuclear power plant.
	Grade 8
ding of a	- recite the rules involved in the reading of a topographic map.
	- construct contour lines from a map with plotted elevations only.
	- construct a topographic profile from a topographic map.
	- make a three dimensional clay model from a small portion of a topographic map.
p.	- name and locate churches, schools and mines from a topographic map.
	- name and locate the steep hills and mountains from a topographic map.
	- recite the direction of any river on a topographic map.
	- recite the elevation of any point on a topographic map.
	- construct a three dimensional topographic profile from a quandrangle of an area of Utica.
atmosphere.	- name the layers of the atmosphere and the major characteristics of each layer.
troposphere.	- list the names of the gases found in the troposphere and the percentage of each.

	- list the important uses of the gases found in th
- how the air in the troposphere is heated.	- demonstrate how air rises when heated.
	- draw a diagram showing how the air in the troposp indirectly heated by the sun.
- how heat is measured.	- solve problems in converting Fahrenheit to celsi celsius to Fahrenheit.
- what the water cycle is and its importance to all living things.	- draw and label a diagram of the water cycle.
- the kinds of clouds and how they are formed.	- be able to recognize and name the various types
- what precipitation is and what causes it.	- list the four forms of precipitation and describe conditions necessary for the formation of each.
- what humidity is and how it is measured.	- give a demonstration showing that evaporation is process.
	- construct a simple psychrometer.
	- determine the relative humidity of the air by co the readings on a psychrometer with a relative hu chart.
- what causes winds.	- demonstrate with the use of a globe, the unequal the earth's surface.
- the location of the major wind belts.	- demonstrate, on a globe, how winds are divided in belts due to the rotation of the earth and the un heating of the earth's surface.
- how wind speed is measured.	- be able to determine the approximate speed of the using the Beaufort scale.
- what causes changes in air pressure.	- demonstrate how air expands when heated and contr cooled.

here is

its importance

they are formed.

hat causes it.

is measured.

nd belts.

ressure.

- list the important uses of the gases found in the troposphere
- demonstrate how air rises when heated.
- draw a diagram showing how the air in the troposphere is indirectly heated by the sun.
- solve problems in converting Fahrenheit to celsins and celsius to Fahrenheit.
- draw and label a diagram of the water cycle.
- be able to recognize and name the various types of clouds.
- list the four forms of precipitation and describe the conditions necessary for the formation of each.
- give a demonstration showing that evaporation is a cooling process.
- construct a simple psychrometer.
- determine the relative humidity of the air by correlating the readings on a psychrometer with a relative humidity chart.
- demonstrate with the use of a globe, the unequal heating of the earth's surface.
- demonstrate, on a globe, how winds are divided into major belts due to the rotation of the earth and the unequal heating of the earth's surface.
- be able to determine the approximate speed of the wind by using the Beaufort scale.
- demonstrate how air expands when heated and contracts when cooled.

- how air pressure is measured.	- construct a simple barometer.
	- make a graph of barometric pressures for one wee
- how a weather map is constructed.	- construct a weather station model from informati from various weather instruments.
	- examine several weather maps to determine how in from weather station models are used to develop all picture of weather patterns.
- the various types of climates throughout the world.	- make a list of climate conditions in various are world and compare them to each other.
	- discuss how the climate of an area might affect living in a given area.
	- discuss how climate has a direct influence on th and commerce of a given area.
- how to read the geologic time table.	- recite the era's and the main theme from each.
	- write a report on the era that most interest him
	- construct a copy of the geologic time table for
- how to differentiate periods and eras.	- name the periods within 3 era's.
	- describe the happenings of those periods.
	- explain the cause and effect of an era.
- the importance of index fossils, and other fossils.	- construct a chart of drawings on common index fo
	- collect three local index fossils.
	- present written report on the fossil of his or he
- disatrophism is the movement of solid parts of the earth caused by its uplifting, folding or tilting.	- cite at least two examples of diastrophic movemer request.

easured.	- construct a simple barometer.
	- make a graph of barometric pressures for one week.
constructed.	- construct a weather station model from information gathered from various weather instruments.
	- examine several weather maps to determine how information from weather station models are used to develop an overall picture of weather patterns.
climates	- make a list of climate conditions in various areas of the world and compare them to each other.
	- discuss how the climate of an area might affect the mode of living in a given area.
	- discuss how climate has a direct influence on the industry and commerce of a given area.
ic time table.	- recite the era's and the main theme from each.
	- write a report on the era that most interest him or her.
	- construct a copy of the geologic time table for themselves.
eriods and eras.	- name the periods within 3 era's.
	- describe the happenings of those periods.
	- explain the cause and effect of an era.
x fossils, and	- construct a chart of drawings on common index fossils.
	- collect three local index fossils.
	- present written report on the fossil of his or her choice.
ement of solid parts its uplifting, folding	- cite at least two examples of diastrophic movements upon request.

	- point out at least one local feature resulting f diastrophic movement.
- evidence for diastrophism has been found in the form of fossil animal and plant remains displaced geographically from the original site of deposition.	- cite instances of deeply buried peat deposits an sea animal remains near the tops of mountains as of diastrophic movements.
	- give at least one local example of sedimentary l displacement resulting from diastrophic movement
- theoretical causes of diastrophism are expansion and contraction of the earth due to heating and cooling, and von-vection currents within it.	- draw a diagram of the earth in cross section, sho possible movements of convection surrents and use diagram in explaining how such currents may be ca internal heat.
	- cite the transatlantic ridge as an example of evi for the operation of convection currents.
	- recognize the concept of isostasy as the sinking land mass into the mantle to a depth governed by density and the pull of gravity.
	- explain the theory of continental drift and provi example of changing magnetic poles and the close between the Africa and South American land masses evidence.
- folds in the earth's surface can be cat-egorized as anticlines, synclines and monoclines.	- use a landform model to point out examples of ant synclines, and monoclines.
	- use a clay model to show how earth movements migh produced these formations.
	- provide local examples of folding.

- point out at least one local feature resulting from diastrophic movement.

sm has been found in
al and plant remains
y from the original

- cite instances of deeply buried peat deposits and fossil sea animal remains near the tops of mountains as evidence of diastrophic movements.

- give at least one local example of sedimentary layer displacement resulting from diastrophic movements.

astrophism are
of the earth
ag, and von-
it.

- draw a diagram of the earth in cross section, showing the possible movements of convection currents and use the diagram in explaining how such currents may be caused by internal heat.

- cite the transatlantic ridge as an example of evidence for the operation of convection currents.

- recognize the concept of isostasy as the sinking of each land mass into the mantle to a depth governed by its density and the pull of gravity.

- explain the theory of continental drift and provide the example of changing magnetic poles and the close fit between the Africa and South American land masses as evidence.

ace can be cat-
ynclines and

- use a landform model to point out examples of anticlines, synclines, and monoclines.

- use a clay model to show how earth movements might have produced these formations.

- provide local examples of folding.

- a fracture in the rock of the earth's crust can result in a fault, a location where parts of the crust has moved differentially.	- define "fault" as the location where there has h movement along a break or rupture in the materi earth's crust.
	- point out a fault using the land form model.
	- use the landform model to point out a hanging w wall and scarp.
- earthquakes are caused principaly by faulting when the crust rebounds in response to released stress.	- describe the relationship between the action of and the occurance of earthquakes.
	- provide the San Andreas fault in California and earthquakes as an example of cause and effect.
- vibrations from the focus of the earthquakes spread outward in all directions, in the form of waves.	- read accounts of California earthquakes and rep to the class.
	- match responses on a teacher made test showing waves are primary waves, A waves are secondary L waves are longitudinal waves.
	- make selections on a teacher make test indicati waves are the fastest of the three, traveling a per second and S waves travel at 2 miles per ho
	- point out, upon request, that earthquakes damag ily due to L waves which are formed from P and upon reaching the surface and travel at about s second.
- siesmographic stations can measure the intensity of the waves and the distance they have traveled.	- construct a simple, working model of a siesmogr describe its function.
	- demonstrate how the distance of the epicenter f station can be calculated from the arrival time P and S waves.

the earth's crust
location where
ved different-

- define "fault" as the location where there has been earth movement along a break or rupture in the material of the earth's crust.

- point out a fault using the land form model.

- use the landform model to point out a hanging wall, foot wall and scarp.

incipaly by
ebounds in.
ss.

- describe the relationship between the action of faulting and the occurance of earthquakes.

- provide the San Andreas fault in California and its related earthquakes as an example of cause and effect.

of the earth-
ll directions,

- read accounts of California earthquakes and report findings to the class.

- match responses on a teacher made test showing that P waves are primary waves, A waves are secondary waves, and L waves are longitudinal waves.

- make selections on a teacher make test indicating that P waves are the fastest of the three, traveling at 3 miles per second and S waves travel at 2 miles per hour.

- point out, upon request, that earthquakes damage is primarily due to L waves which are formed from P and S waves upon reaching the surface and travel at about s miles per second.

measure the
the distance

- construct a simple, working model of a siesmograph and describe its function.

- demonstrate how the distance of the epicenter from the station can be calculated from the arrival times of the P and S waves.

- the behavior of earthquake waves as they travel through different materials inside the earth help geologists learn about the composition of the earth's interior.

- super heated rock, deep within the earth, will become liquid where the pressure of overlying rock is released by a fault.

- volcanos can be classified according to the kind of eruption and the type of cone produced.

- lava is classified according to its viscosity or ability to flow along the earth's surface.

- demonstrate knowledge of the definitions of focu epicenter on a teacher made test.

- differentiate, on a teacher made test, between c pression waves which can travel through any mate and shaking waves which can only travel through

- point out sound waves, and earthquake P waves ar as examples of compression waves; and S waves as of shaking waves.

- explain in terms of the molecular theory of matt pressure as well as heat may determine the state

- describe the relationship between faulting the o of volcanos.

- upon request, characterize cinder cones as compo of ash and cinder, and explosive in nature.

- upon request, characterize shield volcanos as co mainly of lava and erupt in an oozing manner.

- upon request, characterize volcanos of the compo variety as composed of alternate layers of cinde lava, and erupting in a fashion intermediate bet the other two.

- upon request, provide existing or historic examp volcanos in each category.

- pick out a sample of lava from an unlabeled coll other rocks.

- upon request, differentiate between blocky (ah-a and ropy (pa-hoi-hoi) lava in terms of melting p viscosity.

- demonstrate knowledge of the definitions of <u>focus</u> and <u>epicenter</u> on a teacher made test.

quake waves as they
rent materials inside
gists learn about the
rth's interior.

- differentiate, on a teacher made test, between compression waves which can travel through any material and shaking waves which can only travel through solids.

- point out sound waves, and earthquake P waves and L waves as examples of compression waves; and S waves as examples of shaking waves.

ep within the earth,
ere the pressure of
eased by a fault.

- explain in terms of the molecular theory of matter, how pressure as well as heat may determine the state of matter.

- describe the relationship between faulting the occurance of volcanos.

ified according to
and the type of cone

- upon request, characterize cinder cones as composed mainly of ash and cinder, and explosive in nature.

- upon request, characterize shield volcanos as composed mainly of lava and erupt in an oozing manner.

- upon request, characterize volcanos of the composite variety as composed of alternate layers of cinder and lava, and erupting in a fashion intermediate between the other two.

- upon request, provide existing or historic examples of volcanos in each category.

ording to its
o flow along

- pick out a sample of lava from an unlabeled collection or other rocks.

- upon request, differentiate between blocky (ah-ah) lava and ropy (pa-hoi-hoi) lava in terms of melting point and viscosity.

- lava plains result when lava flows from fissures or cracks in the earth's surface rather than from volcanic cones.

- liquid rock which never reaches the surface is called magma.

- batholiths and lacoliths are formations of hardened magma which intruded into the rock near the earth's surface.

- when liquid rock solidifys, Igneous rock is formed.

- that he must learn and comprehend a list of new words which pertain to the field of astronomy.

- when provided with a description of the process, ize the formation as lava plains.

- provide craters of the Moon National Monument in an example of lava plains.

- describe magma as either bassaltic or granitic i

- select samples of granite and bassalt from an un collection of rocks and minerals.

- can provide a sescription, upon request, of a si dike.

- identify sills and dikes as lacolith formations.

- provide a general definition for lacolith concep

- define a batholith as the hardened pool of magma which volcanic activity drew its lava.

- differentiate between samples of granite accordi crystal size, characterizeing each as having coo rapidly or slowly.

- select, from an unlabled collection of rocks, ex of granite, gabbro, bassalt, obsidian and pumice

look up each word on the new list and write down th (s) that deal strickly with astronomy.

- compete in a sort of "spelling bee" using the wo the new list. Not only will the word have to be right, but also the definition must be given.

- hand in each of the new words used correctly in

ava flows from earth's surface cones.	- when provided with a description of the process, characterize the formation as <u>lava plains</u>.
	- provide craters of the Moon National Monument in Idaho as an example of <u>lava plains</u>.
aches the	- describe magma as either bassaltic or granitic in nature.
	- select samples of granite and bassalt from an unlabeled collection of rocks and minerals.
re formations truded into the ace.	- can provide a sescription, upon request, of a sill and a dike.
	- identify sills and dikes as lacolith formations.
	- provide a general definition for lacolith concept.
	- define a batholith as the hardened pool of magma from which volcanic activity drew its lava.
, Igneous	- differentiate between samples of granite according to crystal size, characterizeing each as having cooled rapidly or slowly.
	- select, from an unlabled collection of rocks, examples of granite, gabbro, bassalt, obsidian and pumice.
prehend a rtain to	look up each word on the new list and write down the definition (s) that deal strickly with astronomy.
	- compete in a sort of "spelling bee" using the words from the new list. Not only will the word have to be spelled right, but also the definition must be given.
	- hand in each of the new words used correctly in sentences.

- the planets in order closest to farthest from the sun, also the relative size they are to one another.

- construct a model or draw a picture showing the
each of the planets, as they travel on orbits a
sun. Everything must be labeled and colored.

- make a chart listing the following information:
in order from the sun, diameter of each planet,
each planet is from the sun, number of moons fo
planet, planet year (how long it takes for one

- the name, size, shape and things included in our galaxy.

- write a report on the Milky way galaxy includin
things as size, shape, and what is found within

- the following facts about our sun: its size and how it is determined, how hot it is, and what sunspots are.

- be broken into small groups.

- each group will be responsible for obtaining ce
information about the sun.

- each group will assign one person as spokesman
person will recite to the rest of the class all
information that his group has found on their a
concerning the sun.

- each group will hand in information found.

- that the stars form clusters called constellations and that these constellations have certain names as a result of their arrangement.

- draw and name the north polar constellation.

- observe through a telescope ursa major and ursa
and the north star.

- take pictures of the night sky on different occa
to understand the rotation of the earth more cle

- that the moon travels around the earth about once a month and that the pull of gravity is only about 1/6 there as compared to the earth; also the difference between a solar and a lunar eclipse.

- draw a picture showing the different positions o
moon as it travels around the earth. Also label
position as to name (e.g. new moon, fullmoon, etc

- observe the moon at night twice a week for 4 wee
see the changes that take place.

closest to farthest he relative size her.	- construct a model or draw a picture showing the sun and each of the planets, as they travel on orbits around the sun. Everything must be labeled and colored.
	- make a chart listing the following information: Planets in order from the sun, diameter of each planet, distance each planet is from the sun, number of moons for each planet, planet year (how long it takes for one revolution).
and things included in	- write a report on the Milky way galaxy including such things as size, shape, and what is found within it.
bout our sun: its termined, how hot it are.	- be broken into small groups.
	- each group will be responsible for obtaining certain information about the sun.
	- each group will assign one person as spokesman and the person will recite to the rest of the class all the information that his group has found on their area concerning the sun.
	- each group will hand in information found.
usters called t these constel- ames as a result	- draw and name the north polar constellation.
	- observe through a telescope ursa major and ursa minor and the north star.
	- take pictures of the night sky on different occasions to understand the rotation of the earth more clearly.
around the earth that the pull of 1/6 there as also the differ- nd a lunar	- draw a picture showing the different positions of the moon as it travels around the earth. Also label each position as to name (e.g. new moon, fullmoon, etc.)
	- observe the moon at night twice a week for 4 weeks to see the changes that take place.

- perform weight problems comparing the weight of on the moon and earth.

- explain in his own words why he feels that the pull is so much less.

- demonstrate by use of whatever materials he fee necessary the difference between a solar and lu eclipse. Also explain which is more frequent a

Biology

- the process of photosynthesis.

- identify photosynthesis as the name of the proc which light energy is absorbed and then convert the chemical bond energy of glucose.

- compare, contrast, and relate respiration and p synthesis.

- examine a leaf diagram, identify the various ki cells and structures, and indicate the major fu of each type cell and structure.

- explain the function of guard cells which surro stomata in complex plants.

- explain how scientists determined that water is source of exygen given off during photosynthesi

- relate the details of the light reaction of pho to the dark reaction and of both reactions to t equation for photosynthesis.

- how digestion occurs in simple and complex organism.

- define digestion as the process by which organi large molecules into smaller ones.

- perform weight problems comparing the weight of an object on the moon and earth.

- explain in his own words why he feels that the gravity pull is so much less.

- demonstrate by use of whatever materials he feels necessary the difference between a solar and lunar eclipse. Also explain which is more frequent and why.

Grade 10

Biology

nthesis.

- identify photosynthesis as the name of the process by which light energy is absorbed and then converted to the chemical bond energy of glucose.

- compare, contrast, and relate respiration and photosynthesis.

- examine a leaf diagram, identify the various kinds of cells and structures, and indicate the major function of each type cell and structure.

- explain the function of guard cells which surround the stomata in complex plants.

- explain how scientists determined that water is the source of exygen given off during photosynthesis.

- relate the details of the light reaction of photosythesis to the dark reaction and of both reactions to the simple equation for photosynthesis.

simple and

- define digestion as the process by which organisms break large molecules into smaller ones.

- explain that digestion must take place so that
will be small enough to pass through the cell m

- describe the process of intracellular digestion
occurs in autotrophs.

- describe the process of extracellular digestion
occurs in heterotrophs.

- describe the digestion process in protozoans.

- compare and contrast "two way traffic" and "one
traffic" digestive system.

- compare and contrast the digestive system in an
and in a grasshopper.

- describe the functions of the mouth and esophag
digestive system.

- list and describe the digestive processes which
man's stomach.

- indicate the role of the liver and the gall bla
digestive process.

- list the enzymes which function in the small in
and indicate the types of foods the enzymes aff
the products of the reactions.

- describe the absorption process and the various
and systems involved in this process as it occu
small intestine.

- describe the structure and function of the larg

- how the transport system operates as it exists in various types of organisms.

- describe the transport system as the link betwe
of the organism and its environment.

- explain that digestion must take place so that molecules will be small enough to pass through the cell membrane.

- describe the process of intracellular digestion as it occurs in autotrophs.

- describe the process of extracellular digestion as it occurs in heterotrophs.

- describe the digestion process in protozoans.

- compare and contrast "two way traffic" and "one way traffic" digestive system.

- compare and contrast the digestive system in an earthworm and in a grasshopper.

- describe the functions of the mouth and esophagus in man's digestive system.

- list and describe the digestive processes which occur in man's stomach.

- indicate the role of the liver and the gall bladder in the digestive process.

- list the enzymes which function in the small intestine and indicate the types of foods the enzymes affect and the products of the reactions.

- describe the absorption process and the various structures and systems involved in this process as it occurs in the small intestine.

- describe the structure and function of the large intestine.

- describe the transport system as the link between the cells of the organism and its environment.

om operates as it
s of organisms.

- describe the process whereby water travels from
by successive osmosis to xylem in plants.

- describe the circulatory system in earthworms.

- compare and contrast the circulatory system in
and in anthropods.

- diagram the human circulatory system, list the
structures involved, indicate the function of e
structure, and trace the flow of blood through
system.

- compare and contrast the structures and functio
arteries, veins, and capillaries.

- describe the lymphatic system and how it functi
and indicate the origin of lymph.

- compare and contrast red blood cells, white blo
and platelets.

- list the four blood types indicate which types
received by persons with each different type, a
why some combinations cause agglutionation.

- how the processes of respiration and excretion occur in various organisms.

- define respiration and differentiate between in
respiration and external respiration.

- describe the respiration precoess in simple ani
protists.

- compare and contrast the respiratory system in
worms and in the arthropods.

- describe the lung system found in land animals
it with the respiratory system found in arthrop

- describe the process whereby water travels from root hairs by successive osmosis to xylem in plants.

- describe the circulatory system in earthworms.

- compare and contrast the circulatory system in earthworms and in anthropods.

- diagram the human circulatory system, list the various structures involved, indicate the function of each structure, and trace the flow of blood through the system.

- compare and contrast the structures and functions of arteries, veins, and capillaries.

- describe the lymphatic system and how it functions and indicate the origin of lymph.

- compare and contrast red blood cells, white blood cells, and platelets.

- list the four blood types indicate which types can be received by persons with each different type, and explain why some combinations cause agglutionation.

piration and
us organisms.

- define respiration and differentiate between internal respiration and external respiration.

- describe the respiration precoess in simple animals and protists.

- compare and contrast the respiratory system in the earthworms and in the arthropods.

- describe the lung system found in land animals and compare it with the respiratory system found in arthropods.

- how the skeletal and muscular system function and their relationships to protection, support and locomotion.

- diagram the respiratory system in humans, identif
of the structures, and indicate the function of e
structure.

- compare and contrast inspiration and expiration i
breathing process.

- differentiate between respiration and breathing.

- compare and contrast respiration in plants and an

- define excretion and explain why organisms must r
selves of nitrogenous wastes.

- describe the processes used by freshwater animals
maintaining proper water balance and removing was
material.

- compare and contrast the process of excretion in
earthworm and the grasshopper.

- diagram the human kidney nephron, identify its va
structures, and describe the function of each st

- compare and contrast the advantages and disadvant
an exoskeleton.

- compare and contrast the structure and function
exoskeleton and an endoskeleton.

- compare and contrast locomotion by amoeboid moti
ciliary motion.

- describe the interaction of flexor and extensor

- compare and contrast the structure and function
kinds of muscle found in vertebrates; striated,
and cardiac.

- diagram the respiratory system in humans, identify each of the structures, and indicate the function of each structure.

- compare and contrast inspiration and expiration in the breathing process.

- differentiate between respiration and breathing.

- compare and contrast respiration in plants and animals.

- define excretion and explain why organisms must rid themselves of nitrogenous wastes.

- describe the processes used by freshwater animals in maintaining proper water balance and removing waste material.

- compare and contrast the process of excretion in the earthworm and the grasshopper.

- diagram the human kidney nephron, identify its various structures, and describe the function of each structure.

cular system
tionships to
locomotion.

- compare and contrast the advantages and disadvantages of an exoskeleton.

- compare and contrast the structure and function of an exoskeleton and an endoskeleton.

- compare and contrast locomotion by amoeboid motion and ciliary motion.

- describe the interaction of flexor and extensor muscles.

- compare and contrast the structure and function of the three kinds of muscle found in vertebrates; striated, smooth and cardiac.

- the importance of homeostasis and how some of the many functions of an organism are controlled by chemical control systems.

- the structures of the nervous system and their functions in animals of varying complexity.

- compare and contrast voluntary and involuntary
- describe the function of the hormone thyroxine.
- describe the function of the hormone parathormo
- describe the condition known as diabetes, melli its cause, and its treatment.
- compare and contrast the functions of gluagon a
- list the hormones secreted by the gonads and i function of each.
- explain why the anterior pituitary is considere the master of the endocrine glands.
- list and describe other effects of auxins.
- compare and contrast the functions of sensory motor neurons, and association neurons.
- differentiate between axons and dandrites and their functions.
- describe a synapse.
- explain why it is necessary that neurohumors b destroyed.
- list the major structures found in the vertebr system and indicate the function of each.
- explain how the human central nervous system i
- compare and contrast the human central nervous peripheral nervous system.

- compare and contrast voluntary and involuntary muscles.

ostasis and
unctions of
lled by chem-

- describe the function of the hormone thyroxine.
- describe the function of the hormone parathormone.
- describe the condition known as diabetes, mellitus, its cause, and its treatment.
- compare and contrast the functions of gluagon and insulin.
- list the hormones secreted by the gonads and indicate the function of each.
- explain why the anterior pituitary is considered to be the master of the endocrine glands.
- list and describe other effects of auxins.

nervous system and
mals of varying

- compare and contrast the functions of sensory neurons, motor neurons, and association neurons.
- differentiate between axons and dandrites and indicate their functions.
- describe a synapse.
- explain why it is necessary that neurohumors be destroyed.
- list the major structures found in the vertebrate nervous system and indicate the function of each.
- explain how the human central nervous system is protected.
- compare and contrast the human central nervous system and peripheral nervous system.

- describe the structures involved in a reflex arc reflex act and indicate the function of each.

- differentiate between the sympathetic system and parasympathetic system.

- how stimuli of their environment cause pattens of responses in organisms.

- explain why a reflex is considered to be innate

- distinguish between a reflex act and instinct.

- compare and contrast learned behavior and innate behavior.

- describe a personal habit and explain how motiva reward, and punishment were involved in the deve of learned behavior.

- the mechanism of ecological succession and the characteristics and distribution of the world's various biomes.

- define ecological succession as the series of ch a community during its evolution.

- indicate the relationships of latitude, altitude biome succession.

- explain the influence of light as a limiting fac life in the oceans.

- the biographical background of modern man and the ways his special adaptations have influenced his present role.

- list man's special physical adaptations and sugg they may have evolved.

- describe the theory of divergent evolution which how man and apes may have had a common ancestor.

- compare and contrast man's relationship with his ment with the relationship between other organis their environment.

- describe ways that agriculture and technology ha affected exosystems.

- describe the structures involved in a reflex arc and reflex act and indicate the function of each.

- differentiate between the sympathetic system and the parasympathetic system.

nvironment cause
n organisms.

- explain why a reflex is considered to be innate behavior.

- distinguish between a reflex act and instinct.

- compare and contrast learned behavior and innate behavior.

- describe a personal habit and explain how motivation, reward, and punishment were involved in the development of learned behavior.

gical succession
and distribution
biomes.

- define ecological succession as the series of changes in a community during its evolution.

- indicate the relationships of latitude, altitude, and biome succession.

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ound of modern
ecial adaptations
sent role.

- list man's special physical adaptations and suggest how they may have evolved.

- describe the theory of divergent evolution which explains how man and apes may have had a common ancestor.

- compare and contrast man's relationship with his enviornment with the relationship between other organisms and their environment.

- describe ways that agriculture and technology have affected exosystems.

- man's place in the biosphere and how his influence on the environment can affect the destiny of man and other organisms.	- compare and contrast biological control of insec insecticide controls. - explain what is meant by crop rotation and how t prevents soil depletion. - list ways of reducing wind and water erosion on tural land. - compare and contrast the rate at which man is us fuel supplies and the rate of renewal for these
Physical Science	
- that energy in nuclear changes is exceedingly great.	- compare nuclear energy and chemical energy. - explain the large difference between both types. - write both chemical as well as nuclear reactions - locate the source of this energy in each case. - be able to explain the behavior of each type.
- the difference between nuclear fission and simple chemical changes.	- learn to detect nuclear radiation by use of a F Electroscope, Geiger counter, Scintillaten coun - predict the stability of nuclei. - illustrate the various forms of nuclear power by types of emission that are given off.
- that nuclear reactions help man in his energy conservation problems.	- test a number of ways in which eventually man's of energy will be limited.

iosphere and how his
ironment can affect
nd other organisms.

- compare and contrast biological control of insects and insecticide controls.
- explain what is meant by crop rotation and how this process prevents soil depletion.
- list ways of reducing wind and water erosion on agricultural land.
- compare and contrast the rate at which man is using know fuel supplies and the rate of renewal for these fuels.

Grade 10-11

Physical Science

r changes is

- compare nuclear energy and chemical energy.
- explain the large difference between both types.
- write both chemical as well as nuclear reactions
- locate the source of this energy in each case.
- be able to explain the behavior of each type.

r nuclear fission and
es.

- learn to detect nuclear radiation by use of a Film, Electroscope, Geiger counter, Scintillaten counter.
- predict the stability of nuclei.
- illustrate the various forms of nuclear power by the types of emission that are given off.

help man in his
roblems.

- test a number of ways in which eventually man's source of energy will be limited.

- invent some ideas that would tend to elevate shor energy.
- learn how energy reactors operate to produce ener

- the weather effects on man's environment conditions.

- draw weather maps.
- show how some conditions are suseptable to change
- predict forecasts based on accumulated knowledge representative region.
- learn how to operate the instruments that are use measure weather conditions.

Earth Science

- that observation involve the interaction of the *senses*.
- classify his own observations of the local envir

- that powers of observation are limited by the senses and can be extended by the use of instruments.
- master use of metric ruler, triple beam balance graduated cylinder.

- the measurements of some properties of matter are made by a direct comparison with standards (e.g.; length, mass, volume.)
- measure some of the properties of his environmen approximation of an absolute valve.

- that change can be described as the occurance of an event.
- outline the nature of changes occurring in his e ment from observations of the environment.

- the event occurs if the properties of matter are altered.

- that a change can be described by measuring the rate at which it occurs.

- invent some ideas that would tend to elevate shortage of energy.

- learn how energy reactors operate to produce energy.

s on man's environment

- draw weather maps.

- show how some conditions are suseptable to change.

- predict forecasts based on accumulated knowledge in a representative region.

- learn how to operate the instruments that are used to measure weather conditions.

Grade 11

Earth Science

nvolve the interaction

- classify his own observations of the local environment.

ervation are limited
can be extended by the
.

- master use of metric ruler, triple beam balance and graduated cylinder.

f some properties of
a direct comparison
g.; length, mass, volume.)

- measure some of the properties of his environment at an approximation of an absolute valve.

described as the occurance

- outline the nature of changes occurring in his environment from observations of the environment.

f the properties of matter

be described by measuring
it occurs.

- cyclic change is an orderly manner of events in time and space which reports.	
- the environment is in a state of equilibrium which can be altered easily on a small scale.	- draw inferences about the relationship of energ from direct observations.
- that man's technology has enabled him to disrupt the equilibrium of large portions of his environment.	- draw inferences about man's ability to modify h environment from direct observations. - measure and record amount of pollution in both air use of pollution kits.
- that observations of the altitude of polaris measured as a function of latitudinal distance leads to an interpretation of the earth's shape.	- measure the altitude of Polaris with a sextant his latitude.
- that other evidences that indicate the earth's shape include: photographs of the earth from space, gravimetric measurements.	- gather many cooies of photographs taken of the various space crafts.
- the dimensions of the earth can be determined from observations of the earth from space.	- develop models to illustrate the earth's size a - devise a method for locating a point on the ear - measure the physical properties of any located p
- the apparent daily motion of stars is a circular path.	- collect data on the motions of objects in the s
- the daily rate of motion of stars is constant.	- same as above.
- the sun's apparent daily path through the sky is an arc.	- analyze models of the solar system using locally data.

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vimetric meas-

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earth from space.

of stars is a

of stars is constant.

path through the sky

- draw inferences about the relationship of energy to change from direct observations.

- draw inferences about man's ability to modify his environment from direct observations.

- measure and record amount of pollution in both water and air use of pollution kits.

- measure the altitude of Polaris with a sextant to determine his latitude.

- gather many cooies of photographs taken of the earth from various space crafts.

- develop models to illustrate the earth's size and shape.

- devise a method for locating a point on the earth's surface.

- measure the physical properties of any located point.

- collect data on the motions of objects in the sky.

- same as above.

- analyze models of the solar system using locally obtained data.

- the sun's apparent path varies with the seasons.	- synthesize a simple model and evalutae the mod its applicability.
- the observation of planets indicated that many rotate.	- same as above.
- the points of sunrise and sunset vary with the seasons.	- construct a chart of time of sunrise and sunse latitude 42° N.
- in Utica, the sun's overhead position is not 90°	- make a list of noon sun for Utica for year.
- that air masses are identified on the basis of pressure, moisture and temperature characteristics.	- determine characteristics of air masses from s weather data.
- what within an airmass, at any given altitude, the air temperature field and the humidity field are nearly uniform.	- same as above.
- that a low pressure air mass circulates counterclock wise and toward the center in the northern hemisphere.	- same as above.
- that a high pressure air mass is opposite to the above question.	- same as above.
- that atmospheric conditions are constable where two air masses meet.	- same as above.
- that precipitation may infiltrate the earth's surface, runoff or evaporate.	- describe the nature and movement of water.
- the pemeability of loose material increases with increased particles size.	- describe the relationship between permeability particle size.

h varies with the	- synthesize a simple model and evalutae the model for its applicability.
nets indicated that	- same as above.
nd sunset vary	- construct a chart of time of sunrise and sunset for latitude 42° N.
erhead position	- make a list of noon sun for Utica for year.
entified on the basis of temperature character-	- determine characteristics of air masses from synoptic weather data.
, at any given altitude, old and the humidity rm.	- same as above.
r mass circulates toward the center here.	- same as above.
ir mass is opposite	- same as above.
tions are constable eet.	- same as above.
infil rate the f or evaporate.	- describe the nature and movement of water.
se material increases ss size.	- describe the relationship between permeability rate and particle size.

- the porosity of loose material is dependent upon shape, packing and the mixture of sizes of the particles.	- construct a chart measuring amount of porsity o shape particles.
- that weathering occurs when rocks are exposed to the hydrosphere and the atmosphere.	- analyze earth materials to obtain evidence of w
- rock particles weather at different rates depending on mineral composition.	- measure rates of weathering of rock particles b lab 1x-A-1B state supplement.
- the factors affecting the deposition of particles in a medium.	- analyze and measure the deposition of particles
	- draw inferences about the process in the above
- the composition of rock.	- devise models for the formation of sedimentary non sedimentary rocks.
- the characteristics of minerals that make up rocks.	- analyze rocks to determine their composition.
- the differences between igneous metamorphic and sedimentary rocks as to their origin, hardness and structure.	- identify the characteristics of minerals found sedimentary and metamorphic rocks.
- what evidence to suggest changes occuring in the earth's crust such as: folding and faulting strata, marine fossils found high in mountains.	- identify evidence of crustal changes from his o of the earth's crust.
- that properties of compressional, shear and surface earthquake waves.	- describe the properties of earthquake waves.
- that an analysis of seismic data leads to the inference that solid zoens (crust, mantle, inner core) and a liquid zone (outer core) exist within the earth.	- locate the epicenter and determine time of occu earthquake from an analysis of seismic data.

se material is e, packing and the the particles.	- construct a chart measuring amount of porsity of different shape particles.
urs when rocks are osphere and the	- analyze earth materials to obtain evidence of weathering.
her at different mineral composition.	- measure rates of weathering of rock particles by performing lab 1x-A-1B state supplement.
g the deposition of m.	- analyze and measure the deposition of particles in a medium.
	- draw inferences about the process in the above question.
rock.	- devise models for the formation of sedimentary and non sedimentary rocks.
of minerals that make	- analyze rocks to determine their composition.
een igneous metamorphic s as to their origin, re.	- identify the characteristics of minerals found in igneous sedimentary and metamorphic rocks.
gest changes occuring such as: folding marine fossils found	- identify evidence of crustal changes from his observation of the earth's crust.
mpressional, shear and ves.	- describe the properties of earthquake waves.
eismic data leads to lid zoens (crust, d a liquid zone hin the earth.	- locate the epicenter and determine time of occurence of an earthquake from an analysis of seismic data.

- the bottom layer of a series of sedimentary layers is oldes in geologic events and top layers are youngest.

- that geologic events can be dated by fossil studies.

- that radioactive dating of rocks is the most accurate method of chronologically determining age of rocks.

- that landscape characteristics are important sources in determining type of bedrock in your area.

- apply the law of superpositon to date geologic

- collect a number of fossils in a field trip.

- draw inference concerning ancient life from a s fossils gathered in your locality.

- identify and measure various local landscape fe his area.

series of oldes in op layers are	- apply the law of superpositon to date geologic events.
can be dated by	- collect a number of fossils in a field trip.
ng of rocks is the of chronologically cks.	- draw inference concerning ancient life from a study of fossils gathered in your locality.
teristics are determining type ea.	- identify and measure various local landscape features in his area.